mitas BBT32-T

Control Panel with 34 Buttons, 34 LEDs, LCD Display and serial Interface

User's Manual

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1 General

The “mitas BBT32-T” control panel reduces previous wiring and installation efforts to a minimum.

34 buttons with LED indication form the concept of the basic unit. This unit is operated via a serial interface RS422 or RS485.

Fault or information messages can be displayed on the integrated LC display. The messages are stored in a CSV file on a SD card.

Additionally, 3 digital inputs and 3 digital outputs are available (e.g. to connect a key switch).

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2 Technical Information

General Specifications

Interface:	RS485, RS422
Baud rate:	2.4 to 115.2 kBaud, adjustable
Addresses:	0 to 99
Keys/LEDs:	8 x 4 + 2 + 2 Taster, 8 x 4 + 2 + 2 LEDs + 4 LEDs for status display (2x POWER, FAULT und DATA)
Display:	LCD, two lines with 24 characters each, white LED backlight
Digital inputs:	quantity: 3 (24 VDC) with additional common 0V connection
Digital outputs:	quantity: 3 (24 VDC, max. 200 mA per output)
Text memory:	1024 messages on a SD card (max. 2 GB); 1 message can extend up to 8 lines
Labelling:	labelling strips
Operating voltage:	24 VDC ±20%, protected against polarity reversal
Power consumption:	approx. 150 mA at 24 VDC operating voltage plus current for digital outputs (load dependent)
Mounting:	panel mounting
Protection:	front panel IP65
Housing:	without; option: - housing (powder coated sheet steel), colour: RAL 7016 (anthracite) - housing with pole (powder coated sheet steel), colour: RAL 7016 (anthracite)
Housing dimensions:	see chapter “Mounting Options”
Operating temperature:	0 to +50 ℃
Storage temperature:	-25 to +60 ℃

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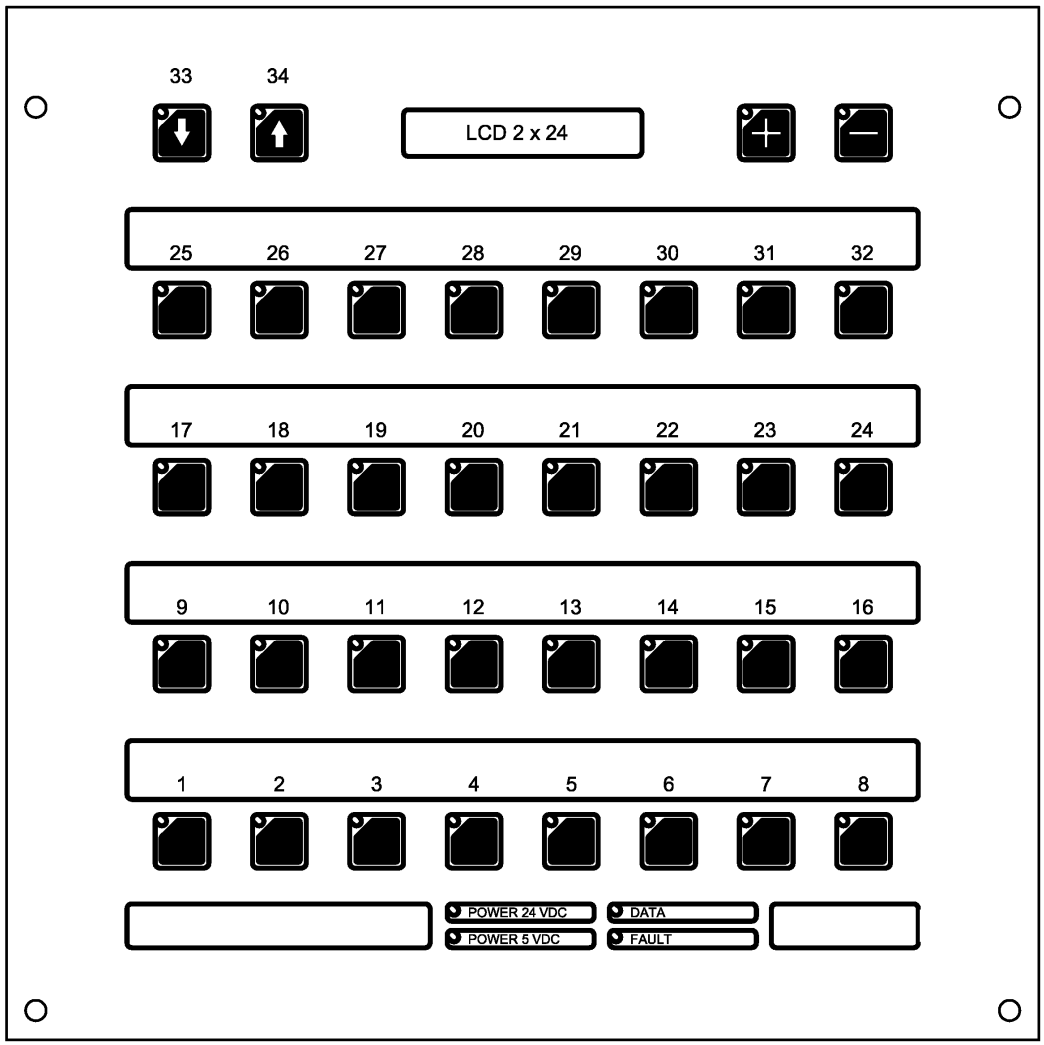
2.1 Serial Communication

All required interface parameters can be adjusted with the help of switches (see chapter “Connector Pin Assignments”).
After a control frame from the Master (for controlling the LEDs or text call at the LCD), the control panel replies with a response frame that represents the states of the buttons.
3 digital inputs and 3 digital outputs can be controlled.

2.1.1 LED / Button Assignment



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2.1.2 LCD Display

- 2 lines with 24 characters each
- white backlight
- 2 buttons, “+” and “-“ for scrolling multiline messages

2.1.3 SD Card

- Type: commercial cards up to 2 GB
- Formatting: FAT
- 1024 messages storable
- A message can have up to 8 lines with 24 characters each

2.1.4 CSV File

Messages can be created in an Excel table.
The file name must be “Texte.csv”.
The first column contains the message number (0 to 1023).
The second column contains the first line of the message (24 characters max.).
The third column contains the second line of the message (24 characters max.).
:
:
The ninth column contains the eighth line of the message (24 characters max.).

Lines without message number in the first column are not evaluated. So, even headlines are possible. The message number must be ascending.

Example:

Alert	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8
0	Text1, Line1	Text1, Line2	Text1, Line3	Text1, Line4	Text1, Line5	Text1, Line6	Text1, Line7	Text1, Line8
1	Text2, Line1	Text2, Line2	Text2, Line3	Text2, Line4	Text2, Line5	Text2, Line6	Text2, Line7	Text2, Line8
2	Text3, Line1	Text3, Line2	Text3, Line3	Text3, Line4	Text3, Line5	Text3, Line6	Text3, Line7	Text3, Line8
3	Text4, Line1	Text4, Line2	Text4, Line3	Text4, Line4	Text4, Line5	Text4, Line6	Text4, Line7	Text4, Line8
Error	**Line 1**	**Line 2**	**Line 3**	**Line 4**	**Line 5**	**Line 6**	**Line 7**	**Line 8**
4	Text5, Line1	Text5, Line2	Text5, Line3	Text5, Line4	Text5, Line5	Text5, Line6	Text5, Line7	Text5, Line8
5	Text6, Line1	Text6, Line2	Text6, Line3	Text6, Line4	Text6, Line5	Text6, Line6	Text6, Line7	Text6, Line8

2.1.5 Starting Procedure

The display shows a starting message with the version number and the interface parameters.

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2.1.6 Control Frame

Frame Structure:

ADR	D1	D2	D3	D4	D5	D6	CHK
Address of the BBT32	Data bytes according to the following table						Checksum: XOR combination of all 7 bytes (*ADR* **XOR** *D1* **XOR** *D2* **XOR** *D3* **XOR** *D4* **XOR** *D5* **XOR** *D6*)

	Bit 7	***Bit 6***	***Bit 5***	***Bit 4***	***Bit 3***	***Bit 2***	***Bit 1***	***Bit 0***
D1	LED 8	LED 7	LED 6	LED 5	LED 4	LED 3	LED 2	LED 1
D2	LED 16	LED 15	LED 14	LED 13	LED 12	LED 11	LED 10	LED 9
D3	LED 24	LED 23	LED 22	LED 21	LED 20	LED 19	LED 18	LED 17
D4	LED 32	LED 31	LED 30	LED 29	LED 28	LED 27	LED 26	LED 25
D5	Message Bit 9	Message Bit 8	Display ON	Output 3	Output 2	Output 1	LED 34	LED 33
D6	Message Bit 7	Message Bit 6	Message Bit 5	Message Bit 4	Message Bit 3	Message Bit 2	Message Bit 1	Message Bit 0

LED
A LED lights, if it's corresponding bit is set.

Message
A message is called with a number (10 bits).

Display ON
The display is switched-on, if the bit is set.

Output
An output is set with its corresponding bit.

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2.1.7 Response Frame

After every control frame, the BBT32 replies with a response frame.

Frame Structure:

ADR	A1	A2	A3	A4	A5	A6	CHK
Address of the BBT32	Response bytes according to the following table						Checksum: XOR combination of all 7 bytes (*ADR* **XOR** *D1* **XOR** *D2* **XOR** *D3* **XOR** *D4* **XOR** *D5* **XOR** *D6*)

	Bit 7	***Bit 6***	***Bit 5***	***Bit 4***	***Bit 3***	***Bit 2***	***Bit 1***	***Bit 0***
A1	Button 8	Button 7	Button 6	Button 5	Button 4	Button 3	Button 2	Button 1
A2	Button 16	Button 15	Button 14	Button 13	Button 12	Button 11	Button 10	Button 9
A3	Button 24	Button 23	Button 22	Button 21	Button 20	Button 19	Button 18	Button 17
A4	Button 32	Button 31	Button 30	Button 29	Button 28	Button 27	Button 26	Button 25
A5	Message Bit 9	Message Bit 8	Display ON	Input 3	Input 2	Input 1	Button 34	Button 33
A6	Message Bit 7	Message Bit 6	Message Bit 5	Message Bit 4	Message Bit 3	Message Bit 2	Message Bit 1	Message Bit 0

Button
If a button is pressed, its bit is set.

Message
Number of current displayed message (10 bits).

Display ON
The display is currently ON if this bit is set.

Input
A set bit means, the input is set.

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2.2 Examples

All examples are valid for device address 1.

Switch-on LED 10:
01 00 02 00 00 00 00 03

Incoming response frame:
01 00 00 00 00 00 00 01

If button 4 is pressed during the controlling, you receive following response:
01 08 00 00 00 00 00 09

Switch display on and show message 20 (all LEDs are out):
01 00 00 00 00 20 14 35

Set output 1:
01 00 00 00 00 04 00 05

If input 3 is set at the same time, you receive the following response:
01 00 00 00 00 10 00 11

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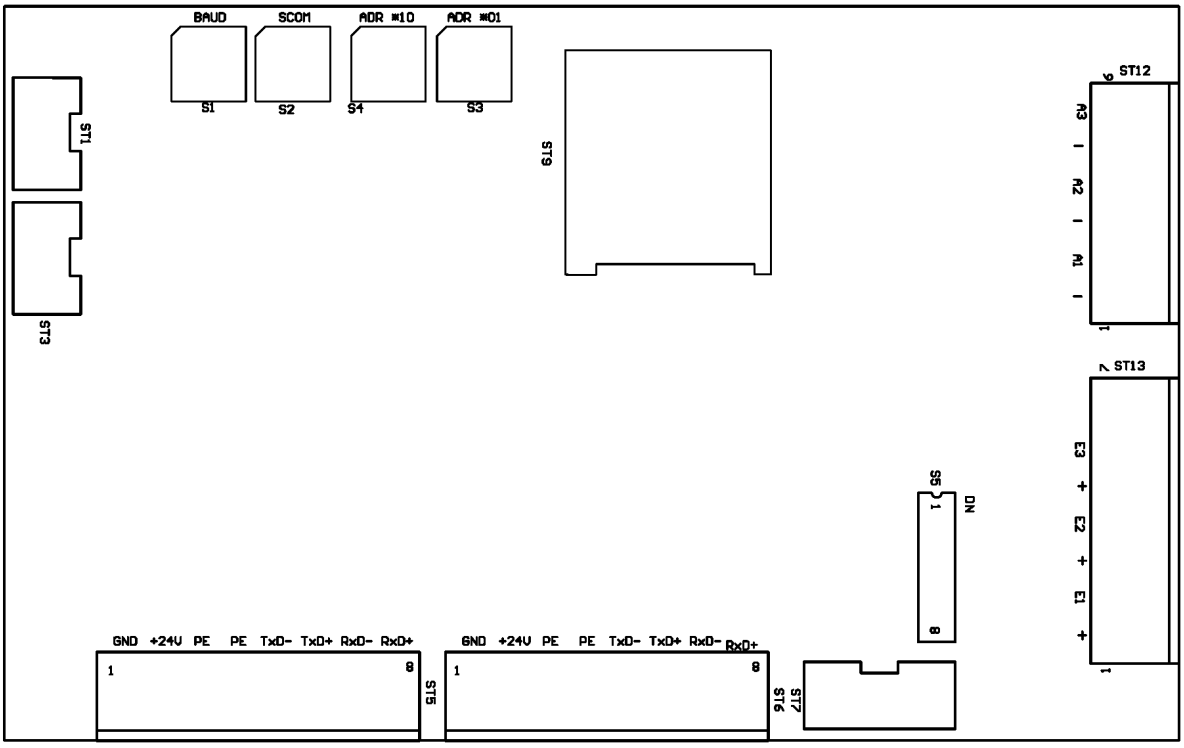
3 Connector Pin Assignments / Settings



3.1 Connectors

Power Supply, Interface (8-pole Plug Connectors ST5, ST6)

All pins of ST5 are connected with those of ST6.

Pin	Assignment	Description
1	GND	Power Supply
2	+24 VDC	
3	PE	
4	PE	
5	Tx-	Interface RS422 or RS485
6	Tx+	
7	Rx- or Rx/Tx-	
8	Rx+ or Rx/Tx+	

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Digital Outputs (6-pole Plug Connector ST12)
The outputs supply 24 VDC, maximum current load is 200 mA per output.

Pin	Labeling	Assignment
1		GND
2	A1	Output 1
3		GND
4	A2	Output 2
5		GND
6	A3	Output 3

Digital Inputs (7-pole Plug Connector ST13)
Inputs are set (via Vout) with +24 VDC.
The common GND pin is used for the connection of initiators.

Pin	Labeling	Assignment
1	+	Vout
2	E1	Input 1
3	+	Vout
4	E2	Input 2
5	+	Vout
6	E3	Input 3
7	-	0V

SD Slot (ST9)
Slot for commercial SD cards with up to 2 GB memory

Optional interface for Profibus or Profinet interfaces of microSYST (ST1 and ST3)

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3.2 Switches

RS422/485 Bus Termination, Mode (DIP S5)

At the first and the last device connected to a RS422/485 bus line, the bus termination must be set.

Bus Termination RS422/485	DIP1	DIP2	DIP3	DIP4
set	OFF	OFF	ON	ON
not set	OFF	OFF	OFF	OFF

Modus	DIP5
BBT32-T	ON: Standard setting (recommended)
BBT32	OFF: Controlling like previous version mitas RS/BBT32 (X-M22-CB325E-001) Limitations: - Display and upper two buttons without function - different control frame

Interface	DIP7	DIP8
RS422	OFF	OFF
RS485	ON	ON

Baud Rate, Test (Coding Switch BAUD, S1)

Position	Function
0	not allowed
1	
2	
3	Baud rate: 1200 Baud
4	Baud rate: 3600 Baud
5	Baud rate: 4800 Baud
6	Baud rate: 7200 Baud
7	Baud rate: 9600 Baud
8	Baud rate: 19200 Baud
9	Baud rate: 38400 Baud
A	Baud rate: 57600 Baud
B	Baud rate: 115200 Baud
C	*LED Single test:* All LEDs are successively switched-on and afterwards switched-off again
D	*Button test:* If a button is pressed, it's corresponding LED lights up.
E	*LCD test:* Segment test of the LCD display
F	*HEX switch test:* Position of HEX switches is shown in the display

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Data Format (Coding Switch SCOM, S2)

Position	Parity	Stop Bits	Data Bits
0	N (none)	1	7
1	N (none)	1	8
2	N (none)	2	7
3	N (none)	2	8
4	E (even)	1	7
5	E (even)	1	8
6	E (even)	2	7
7	E (even)	2	8
8	O (odd)	1	7
9	O (odd)	1	8
A	O (odd)	2	7
B	O (odd)	2	8
C	not allowed		
D			
E			
F			

ADR*10 (Coding Switch S4)
The switch sets the decade of the address.

ADR*1 (Coding Switch S3)
The switch sets the unit position of the address.

3.3 Status-LEDs

The status LEDs of the front have the following meaning:

LED	Meaning
POWER 24VDC	lights static green if the supply power +24 VDC is connected
POWER 5VDC	lights static green, if the supply power +5 VDC is internally created
DATA	lights yellow at every received frame
FAULT	lights red at a faulty interface configuration (for example wrong baud rate, wrong parity, etc.)

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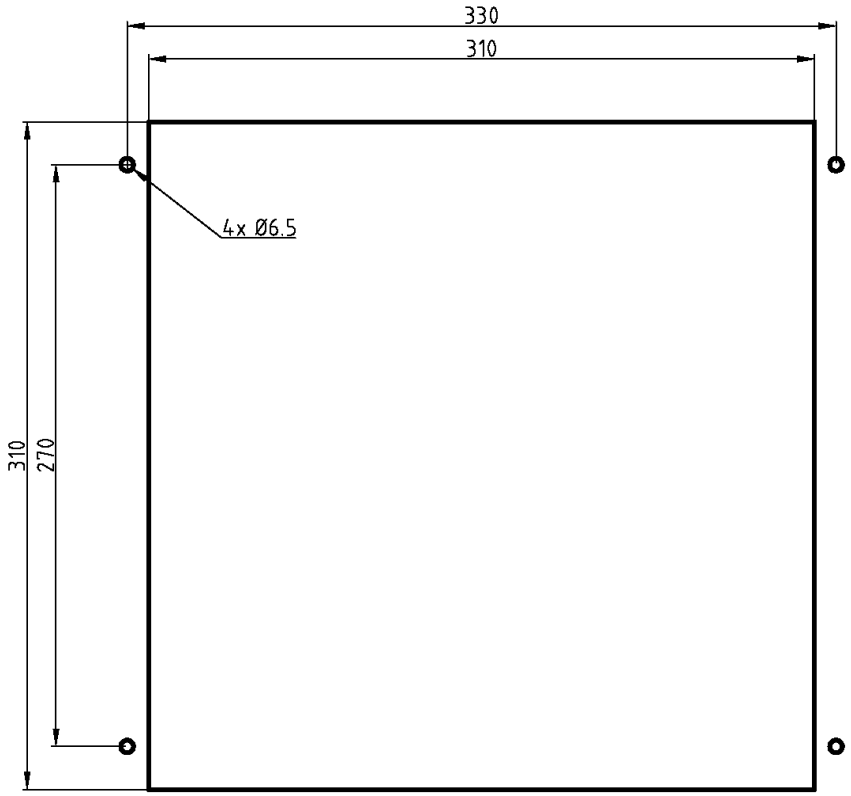
4 Mounting Options

4.1 Panel Mounting



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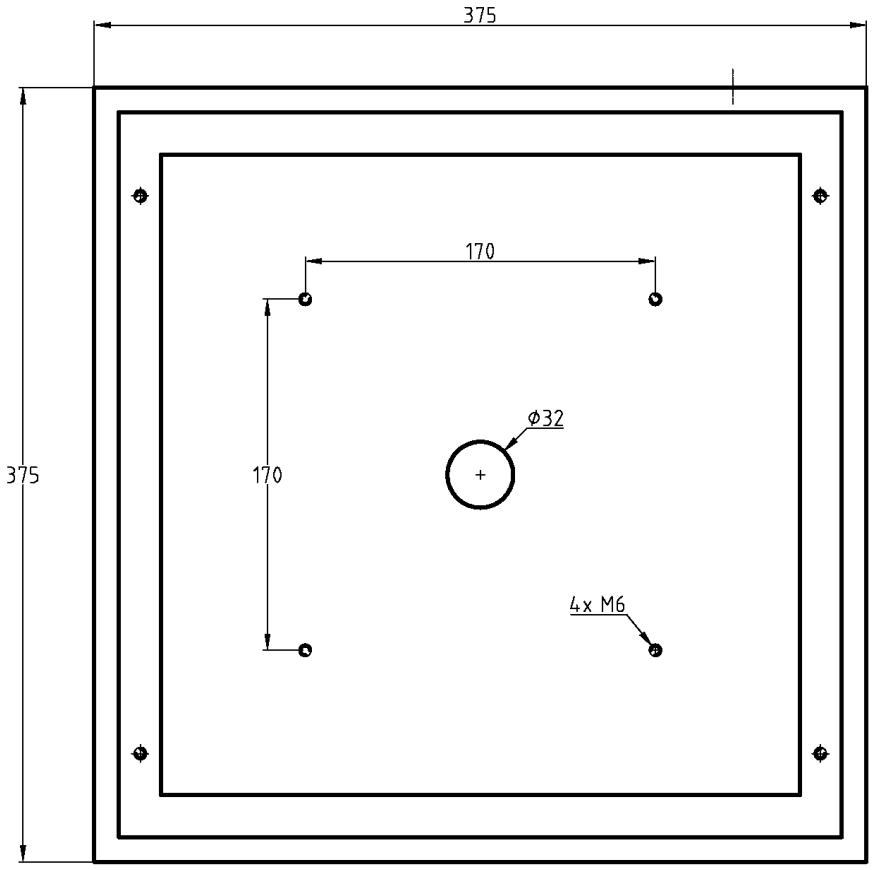
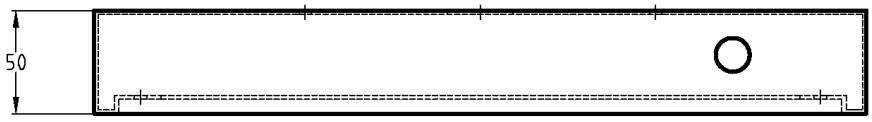
4.2 Housing





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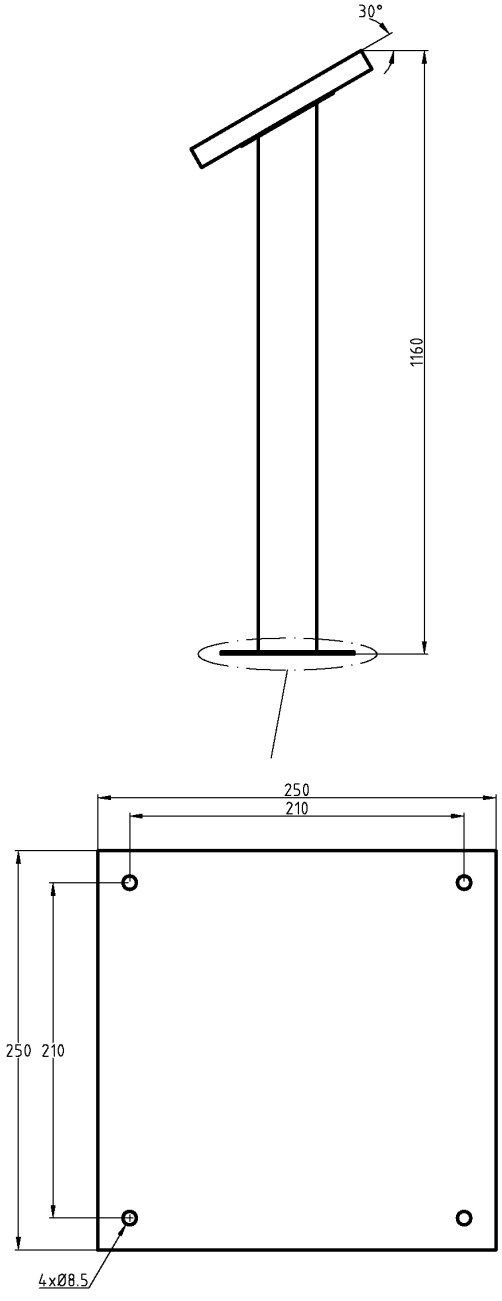
4.3 Pedestal



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5 Appendix

5.1 Maintenance and Care

Observe the following instructions:

- Display quality is impaired by direct illumination with bright light sources and/or direct sunlight.
- The device must be switched off before cleaning.
- Protect the device from excessive humidity, extreme vibration, direct sunlight and extreme temperatures. Non-observance may lead to malfunctioning or destruction of the device. Under certain circumstances electrical shock, fire and explosion may occur as well. Information concerning allowable ambient conditions, including recommended temperature ranges, can be found in the chapter entitled “Technical Information”.
- The control panel may not be placed into service if the device and/or the power cable are known to be damaged.
- Do not attempt to repair the device yourself. The guarantee is rendered null and void if the device is tampered with by unauthorized persons.

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5.2 Warranty / Liability

For the product, liability is assumed for defects, which existed at the delivery date according to our General Terms and Conditions.

Technically changes as well as errors are excepted. A claim for delivery of a new product does not exist. The buyer has to check the received product immediately and indicate evident defects at the latest 24 hours after detection. Non-observance of notification requirements is equated with acceptance of the defect. Not immediately visible defects have to be indicated immediately after their perception too.

Generally, defects and their symptoms must be described as accurately as possible in order to allow for reproducibility and elimination. The buyer must provide for access to the relevant device and all required and/or useful information at no charge and must make all of the required data and machine time available free of charge.

The guarantee does not cover defects, which result from non-observance of the prescribed conditions of use, or from improper handling.

If the device has been placed at the disposal of the buyer for test purposes and has been purchased subsequent to such testing, both parties agree that the product is to be considered “used” and that it has been purchased “as is”. No guarantee claims may be made in such cases.

The General Terms and Conditions of microSYST Systemelectronic GmbH in current version apply as well.

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5.3 Versions Overview

Version	Date	Remark, Description
1.00	21.04.10	Document created
1.10	25.08.10	Additional information
1.20	21.08.12	Nickl: RS485 connection assignment added; DIP switch settings for RS422/485 bus termination corrected
1.30	19.03.13	Company address, warranty changed
1.40	12.06.13	Description of DIP switch for mode setting
1.50	22.10.13	Logo

Certified per **DIN EN ISO 9001**.

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